

(12) United States Patent

Kanenari

(54) TIRE INFORMATION OBTAINING DEVICE, TIRE CONDITION MONITORING SYSTEM, AND METHOD FOR RECOVERING PUNCTURE REPAIR LIQUID

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See application file for complete search history.

(56)References Cited

U.S. PATENT DOCUMENTS

2002/0046599 A1* 4/2002 Chuang B60C 23/0494 2010/0328059 A1* 12/2010 Kanenari B60C 23/0494 340/447

(Continued)

FOREIGN PATENT DOCUMENTS

DE 101 42 354 3/2002 10 2010 030 506 12/2010 DE

(Continued) OTHER PUBLICATIONS

Kanenari WO 2011064991 Transmission device for transmitting information about tire condition and tire condition monitoring system.*

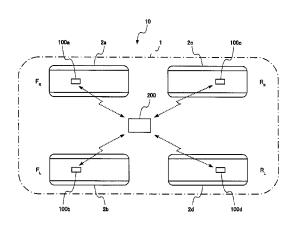
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ABSTRACT

A tire information obtaining device provided in a tire cavity region for obtaining tire information related to a condition of a tire includes: a sensor that detects the state of gas in the tire cavity region as the tire information; a valve; and a housing having an internal space for containing the sensor in a state of being compartmentalized from the tire cavity region, a ventilation hole for allowing communication between the internal space and the tire cavity region, and a communication hole connected to a cavity region side opening part of the valve at an end portion on the tire cavity region side and allowing communication between the cavity region side opening part

19 Claims, 17 Drawing Sheets



(57)

and the tire cavity region.